July, 1869, p. 94), that Sédillot now expresses himself in favour of this operation, and that he relates a successful case in his own practice. Maisonneuve, according to Dr. Suckley (*New York Journ. of Med.*, May, 1858, p. 353), had performed this operation in December, 1857. Dr. S. adds that the patient was a young woman suffering from morbus coxarius, and that in two months after the operation she was doing well, although much reduced by suppuration and long confinement. It seems strange that the above reporters should have overlooked this case. A case is also reported by Verneuil in the *Gazette des Hôpitaux*, No. 133, in which, in a similar case to that of Maisonneuve, the operation proved fatal on the fourth day.

But we must now bring our imperfect notice of the volume before us to a close. We do it with reluctance, as so much of interest and practical value remains; as, for example, in the chapter on ophthalmology, written by Mr. Streatfeild; that on diseases of the jaws and their appendages; on plastic surgery of the face; the treatment of harelip and uranoplasty, laryngotomy and tracheotomy; diseases of the breast; hernia; diseases of the rectum; lithotomy; diseases of the testis; ovariotomy, etc. etc. We have ventured to expose what we believe to be omissions and inaccuracies, and to criticize certain opinions, both of author and editor. But the great value of Mr. Erichsen's *Science and Art of Surgery* has been too long established to require praise at our feeble hands, and the annotations of Dr. Ashhurst, brief from necessity, on account of its already great size, nevertheless add to the completeness and excellence of the work. To the publisher much praise is due for the creditable manner in which he has issued this standard treatise. G. C. B.

ART. XXII.—*The Mechanism of Dislocation and Fracture of the Hip; with the Reduction of the Dislocations by the Flexion Methods.* By HENRY J. BIGELOW, M.D., Professor of Surgery and Clinical Surgery in the Medical School of Harvard University, Surgeon of the Massachusetts General Hospital, etc. etc. With illustrations. Royal 8vo. pp. 150. Philadelphia: Henry C. Lea, 1869.

DR. BIGELOW has devoted special attention to the surgery of the hip-joint for more than eight years, having read his first paper on the subject before the Boston Society for Medical Improvement in the month of June, 1861. He has since discussed the matter before the Massachusetts State Medical Society (in 1864), and before the American Medical Association (in 1865). In the present very handsome volume (which he still modestly calls a "paper"), he has systematically arranged the results of his eight years' study, adding references to cases reported by other writers, and embellishing his pages with fifty-two excellent wood-cuts, many of which are original.

The mechanism of dislocations of the hip has always been a puzzle to students, and we may add to practitioners also; and though of late years we have come to recognize, empirically, that these dislocations may be reduced by much gentler methods than were adopted by our predecessors; yet it is probable that no two surgeons could be found who would agree in every particular as to the mode in which their manipulations were effective. The chief point of dispute has always been, and still is, as to the relative share taken by the muscular and ligamentous structures of the joint, respectively, in producing and maintaining the luxation, and in assisting or impeding its reduction.

The advocates of the doctrine which affirms the efficiency of the muscles justly observe that, if these did not by their contraction maintain displacement, it ought to be as easy to reduce a dislocation without anæsthesia as with its aid; and in fact, in cases of young children (whose muscular resistance is feeble), anæsthesia is not essential; but, on the other hand, it may with equal justice be retorted, that, were the muscular structures alone effective in keeping up a dislocation, the use of ether or chloroform should abolish all resistance, and the surgeon ought then to be able to slip the head of the bone in or out of the socket at will—a possibility which every-day experience disproves.

Hence the true state of the case is, we think (and this our author seems to acknowledge), that while the ligaments of the joint are chiefly concerned in the mechanism of dislocation, the surrounding muscles add greatly to the difficulty of reduction, not only by their contraction, under the influence of the patient's will, and by their tonic contraction or passive force, but by an absolute spasmodic contraction to which they are excited by a reflex process, which is in no degree under the control of the patient, and which, in the case of a vigorous adult, can best be done away with by inducing profound anæsthesia.

The muscular impediments can therefore be removed by using ether or chloroform; the ligamentous obstruction to reduction can only be removed either by violent stretching or tearing, as was not unusual in the days of pulleys and Jarvis's adjuster, or by eluding the resistance by manipulation judiciously applied, relaxing the tense fibrous bands, and gently, and on simple mechanical principles, restoring the displaced bone to its proper situation.

To understand, then, how to effect reduction by manipulation, it is necessary to comprehend the nature of the ligamentous obstructions, and how they are to be overcome. This matter has been closely investigated by Dr. Bigelow, his attention having been, in the first place, directed to it almost accidentally (p. 10), and we must in candor say that his explanation appears to us more simple and more reasonable than any which has hitherto appeared. The whole mechanism of dislocations of the hip, and of their reduction, is dependent on the condition of the anterior part of the articular capsule, which is, in this situation, thickened into a fibrous band commonly described as the ilio-femoral ligament.

> "This ligament is more or less adherent to the acetabular prominence and to the neck of the femur; but it will be found, upon examination, to take its origin from the anterior-inferior spinous process of the ilium, passing downward to the front of the femur, to be inserted fan-shaped into nearly the whole of the oblique spiral line which connects the two trochanters in front—being about half an inch wide at its upper or iliac origin, and but little less than two inches and a half wide at its fan-like femoral insertion. Here it is bifurcated, having two principal fasciculi, one being inserted into the upper extremity of the anterior intertrochanteric line, and the other into the lower part of the same line, about half an inch in front of the small trochanter. The ligament thus resembles an inverted Y, which suggests a short and convenient name for it."

In the large majority of hip dislocations, both branches of this "Y ligament" remain intact; in a few the outer branch is broken, the inner remaining; while in others, which are properly called Irregular Dislocations, both branches are broken. Dr. Bigelow justly, we think, rejects the name of dislocation "into the ischiatic notch," and gives to this, which is a mere variety of that on the dorsum ilii, the more accurate title of "dorsal dislocation below the tendon;" the tendon in question being that of the obturator internus muscle, behind or below which (with a part of the capsule), the head of the bone is in these cases confined. Dr. Bigelow gives the following classification of dislocations of the hip, which is anatomically correct; though for practical purposes, it seems to us, his first two and last three regular dislocations might be considered in either case as forming but one variety.

"I. The Regular Dislocations, in which one or both branches of the Y ligament remain unbroken.
   1. Dorsal.
   2. Dorsal below the tendon (*ischiatic notch of Cooper.*)
   3. Thyroid and downward.
      Obliquely inward on the thyroid foramen, or as far as the perineum.
      Vertically downward.
      Obliquely outward as far as the tuberosity.
   4. Pubic and sub-spinous.
   5. Anterior oblique. } *Both branches entire.*
   6. Supra-spinous.
   7. Everted dorsal. } *External branch broken.*
II. The Irregular Dislocations, in which the Y ligament is wholly ruptured, and whose characteristic signs are therefore uncertain."

We would gladly follow Dr. Bigelow in his able exposition of the exact mechanism of each of these varieties of dislocation, the manipulation required for reducing each of which becomes obvious, as soon as that mechanism is clearly understood. To do this satisfactorily would, however, require more space than our limits will allow, and, besides, a mere verbal description, without the assistance of the illustrative wood-cuts, could hardly convey a fair idea of Dr. Bigelow's reasoning. Suffice it to say that, in the dorsal dislocations, the outer branch of the Y ligament is the one principally concerned; while in all the rest, it is the condition of the inner branch that determines the surgeon's motions in effecting reduction. With regard to reduction, it is evident, from a consideration of the anatomical relations of the part concerned, that extension in the line of the axis of the trunk can only act by violence, stretching or tearing the Y ligament, and that hence the first step in all the processes of manipulation must be to *relax* the ligament by *flexing* the thigh on the pelvis. The leg is flexed on the thigh, simply as a matter of convenience and to gain leverage. Having relaxed the Y ligament, the dislocation may often be reduced by *jerking* the head of the bone into its socket, by direct *traction* in a direction vertically upwards (the patient's trunk being recumbent), by the *gentle shaking* recommended by Hippocrates (p. 28), or by the rotation and circumduction methods, which must be varied according to the nature of the particular luxation. In the backward dislocations, having relaxed the Y ligament by flexing the thigh on the pelvis, the limb being somewhat inverted (a movement which, in the dislocations behind the tendon, likewise dislodges the head of the bone from its abnormal seat), the surgeon employs abduction and rotation outwards (as directed by Drs. Nathan Smith and Reid), and thus fixes the great trochanter against the outer branch of the Y ligament, causing the latter to roll around the neck of the bone, and thus to serve as a kind of sliding fulcrum by which to pry the head of the bone into its socket.

In the thyroid dislocation the proceeding is reversed—the *inner* branch of the Y ligament, with the obturator muscle, being made to wind around the neck of the femur by *ad*duction and *inward* rotation. If in any case difficulty is met with from the smallness of the capsular orifice, it can readily be enlarged by abduction or circumduction outwards, in the case of the backward dislocations, or by adduction or circumduction inwards, in the case of those in a forward direction.

> "To reduce the other varieties of downward luxation, the femur should be flexed and its head drawn and guided towards the socket, during which manœuvre these dislocations are sometimes converted into that upon the thyroid foramen, or upon the dorsum below the tendon."
>
> Reduction of the pubic dislocation by rotation "is to be accomplished by much the same method as in the thyroid dislocation, except that in the pubic luxation the flexed limb should be carried across the sound thigh at a higher point."

The three remaining regular dislocations may be reduced by first converting them into the ordinary dorsal variety, and then proceeding as for an original dorsal luxation.

We have thus endeavoured to indicate as briefly as possible the *principle* upon which reduction by manipulation is to be effected; for the details of treatment and the modifications suited to each variety, we must refer the reader to Dr. Bigelow's pages. We will merely add that, in flexing the thigh so as to relax the Y ligament, if it be too much flexed, the relaxation will be excessive, and the ligament will not serve as a fulcrum on which to exercise the necessary leverage; while, if the capsular laceration be very large, if the limb be too much abducted, the dorsal may be converted into a thyroid dislocation, or *vice versâ*, in the attempt to rock the head of the bone into the acetabulum. This risk can be avoided by limiting the degree of abduction, and *lifting* the limb during the manipulation.

Under the heading of "Special Conditions of Dislocation," Dr. Bigelow discusses, successively, old dislocations and their reduction, dislocation from hip-disease, dislocation of the hip with fracture of the shaft of the femur, and spontaneous dislocation. With regard to the treatment of old dislocations, Dr. Bigelow's experience confirms our own, that there is not so much difficulty in *effecting* as in *maintaining* reduction, on account of secondary changes in the head of the bone and the acetabulum. In such a case, Dr. Bigelow recommends that the limb should be fixed in the position in which reduction was effected, until the cotyloid cavity becomes again excavated by absorption. For effecting reduction in old dislocations, or in cases of dislocation complicated with fracture, an ingenious apparatus is described and figured, by which *angular extension* may be made.

> "Although the need of this apparatus may be rare," says Dr. Bigelow, "it will prove occasionally efficient in reducing a luxation of long standing or complicated with fracture. At any rate, I cannot believe that the period is remote when longitudinal extension by pulleys to reduce a recent hip luxation will be unheard of."

Dr. Bigelow gives an account of three cases in which patients possessed the power of luxating and reducing the head of the thigh-bone by muscular action. In all of these the direction of the dislocation was dorsal. We have ourselves met with one case in which the patient possessed the power of spontaneously producing a thyroid dislocation. In this instance the patient was a female and epileptic. She had been an inmate of both the Pennsylvania and the Philadelphia Hospitals, and was in the habit of dislocating her thigh in public places in order to excite sympathy.

The second portion of Dr. Bigelow's volume is devoted to Fractures of the Neck of the Femur, which the author proposes to divide simply into "1st. The impacted fracture of the neck into the trochanter; 2d. Other fractures of the neck." As he very justly remarks, the application of the terms *intra-capsular* and *extra-capsular* has not much practical value, as even after death it is often impossible to say whether a certain fracture has been within or without the capsular ligament; while during life the distinction is still more difficult, for the reason that the attachments of the capsule vary greatly in different subjects. Moreover, the treatment is precisely the same for both intra- and extra-capsular lesions. The signs of the impacted fracture are pain and tenderness, slight shortening (usually about half an inch), eversion, or rather, impossibility of inversion, with rotation of the trochanter in an arc around the head of the bone, and an absence of crepitus. To these we would add flattening of the trochanter, which, though very slight, can, we believe, be usually detected by careful inspection. The anatomical structure of the neck of the femur, which is well described by Dr. Bigelow, explains the occurrence of eversion and shortening as the almost necessary accompaniment of impaction; in some rare cases, however, where the comminution of the shaft is greater, there is positive inversion. The treatment of impacted fracture does not require extension, but in other respects is the same as that for unimpacted fracture of the same part.

The concluding pages are devoted to fractures of the pelvis. Dr. Bigelow justly remarks that the diagnosis of fractured acetabulum is unwarranted in cases where there is no crepitus. Mere inability to keep the head of the bone in place, after reduction of a dislocation, is more likely to be due to other causes, and can commonly be remedied by fixing the limb in the position of angular extension, or in that particular posture in which the reduction was finally accomplished.

A sufficiently full Index terminates Dr. Bigelow's handsome book, of the main features of which we have endeavoured to give our readers a condensed abstract. It is a very useful book, and, we believe, sound and thoroughly practical. We doubt not that it will add to its author's already high reputation as both a thinking and a working surgeon. There are one or two slight literary blemishes which should have been corrected by the proof-reader: thus, in the summary on page 27, which we have quoted, the sentence "The irregular dislocations . . . whose characteristic signs, etc.," is manifestly ungrammatical, and should read "the characteristic signs of which." Again, the word "perpendicular" is several times used, where "vertical" would explain more exactly what is meant. These things are indeed scarcely worth mentioning, and would not attract attention but for the great scientific excellence and general literary and artistic beauty of the book. The paper and press-work (executed at the Cambridge University Press) are all that could be desired, while the wood-cuts are really very finished productions. J. A., JR.